

<b>Notice of Allowability</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/649,442		MOSIER ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Fred Ferris		2128	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 26 August 2003.
2. ☒ The allowed claim(s) is/are 1-20.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All   b) ☐ Some\*   c) ☐ None   of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)</li> <li>2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)</li> <li>3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br/>Paper No./Mail Date _____</li> <li>4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br/>of Biological Material</li> </ol> | <ol style="list-style-type: none"> <li>5. <input type="checkbox"/> Notice of Informal Patent Application</li> <li>6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),<br/>Paper No./Mail Date <u>20060831</u> .</li> <li>7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment</li> <li>8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance</li> <li>9. <input type="checkbox"/> Other _____.</li> </ol> |
|--|---|

*Fred Ferris*  
FRED FERRIS  
PRIMARY EXAMINER  
7/21/03

### **DETAILED ACTION**

1. Claims 1-20 have been presented for examination based on applicant's amendment filed 26 August 2003. Claims 1-20 have been examined and found to be distinguished over the prior art of record. Accordingly, claims 1-20 have been allowed in view of the Examiner's Amendment of record and reasons for allowance appearing below. Drawing submitted 26 August 2003 are approved by the examiner.

### **EXAMINER'S AMENDMENT**

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Tom Jurecko on 29 August 2006.

Amend independent claims 1 and 15 as follows:

In the last line of claim 1 (page 21, line 22) **insert** the phrase "and store" between the words "generate" and "a". The last line of claim 1 should now read:

"generate and store a constraint satisfied acceleration profile."

In the last line of claim 15 (page 24, line 25) **delete** the semicolon (;) after the word "respectively" and **insert** the phrase ",and storing the result." The last line of claim 15 should now read:

"second and third scaling factors, respectively, and storing the result."

Also, in line 22 of claim 15 **delete** the word “and” after the term “acceleration curve;”

**Allowable Subject Matter**

3. Claims 1-20 are allowed over the prior art of record.

The following is an examiner’s statement of reasons for allowance:

Applicants are disclosing a computerized method for generating an acceleration profile for a valve operating cam by satisfying constraints where a valve verses cam angle profile is generated and defined by interconnected acceleration curve points and solved by scale factor equations for the valves in adjusting acceleration curve parameters. This has been disclosed in the prior art of record.

While these elements are individually disclosed in the prior art, the prior art of record does not meet the conditions as suggested in MPEP section 2132, namely:

“The identical invention must be shown in as complete detail as is contained in the ... claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an **ipsissimis verbis** test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).”

In particular, the prior art of record does not disclose the specific sequence of method steps including using a curve fitting routine to form a draft acceleration curve interconnecting points, developing a set of equations for each of the constraints in terms of parameters of the draft acceleration curve and scaling factors for each section of the

draft curve between roots, and subsequently forming a determinant for the set of equations (four equations, claim 15), in combination with selecting a point on the draft curve as an adjustment point, varying the adjustment point to an adjustment acceleration value that forces the determinant to substantially zero, further using the curve fitting routine to generate an adjusted acceleration curve including the adjustment acceleration value, solving the set of equations (four equations, claim 15) for values of the scaling factors as a function of parameters of the adjusted acceleration curve, and subsequently multiplying values in sections of the draft acceleration curve between roots by resultant values of a corresponding scaling factor (valve opening, claim 15) to generate a constraint satisfied acceleration profile, as required by independent claims 1 and 15.

The closest prior art uncovered during examination teaches certain limitations of the claimed invention as follows:

- "Design and Development of a Mechanical Variable Valve Actuation System", Pierik et al, Variable Valve Actuation 2000, SAE 2000-01-1221, SAE March 2000: also teaches valve lift and acceleration profiles based on constrained cam design parameters and experimental data relating cam angle but again does not teach the specific sequence and combination of method steps relating to developing a set of equations for each of the constraints in terms of parameters of the draft acceleration curve, scaling factors, and each section of the draft curve between roots, and subsequently forming a determinant for the set of equations (four equations, claim 15), in combination with selecting a point on the draft curve as an adjustment point, varying

the adjustment point to an adjustment acceleration value that forces the determinant to substantially zero, as required by independent claims 1 and 15.

- "Numerical-Experimental Analysis of the Timing System of an Internal Combustion Engine", Cali et al, University of Rome, October 2001: teaches valve lift and acceleration profiles based on constrained cam design parameters and kinematic data relating cam angle but does not teach the specific sequence and combination of method steps relating to developing a set of equations for each of the constraints in terms of parameters of the draft acceleration curve, scaling factors, and each section of the draft curve between roots, and subsequently forming a determinant for the set of equations (four equations, claim 15), in combination with selecting a point on the draft curve as an adjustment point, varying the adjustment point to an adjustment acceleration value that forces the determinant to substantially zero, as recited in claims 1 and 15 as noted above.

- "ADAMS/Engine powered by FEV", MSC.ADAMS Product Specification MSC 2003: teaches applying constraints to cam acceleration profiles and generating acceleration profiles based on modified design parameters but again does not teach the specific sequence and combination of method steps but does not teach the specific sequence and combination of method steps relating to developing a set of equations for each of the constraints in terms of parameters of the draft acceleration curve, scaling factors, and each section of the draft curve between roots, and subsequently forming a determinant for the set of equations (four equations, claim 15), in combination with selecting a point on the draft curve as an adjustment point, varying the adjustment point

*to an adjustment acceleration value that forces the determinant to substantially zero, as required by the limitations of independent claims 1 and 15.*


*The features noted above render the claimed invention non-obvious over the prior art of record. Dependent claims 2-14 and 16-20 are deemed allowable as depending directly or indirectly from independent claims 1 and 15.*

*Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."*

#### **Conclusion**

*4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred Ferris whose telephone number is 571-272-3778 and whose normal working hours are 8:30am to 5:00pm Monday to Friday. Any inquiry of a general nature relating to the status of this application should be directed to the group receptionist whose telephone number is 571-272-3700. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached at 571-272-3780. The Official Fax Number is: (571) 273 8300*

Fred Ferris, Primary Examiner  
Simulation and Emulation, Art Unit 2128  
U.S. Patent and Trademark Office  
Randolph Building, Room 5D19  
401 Dulany Street  
Alexandria, VA 22313  
Phone: (571-272-3778)  
Fred.Ferris@uspto.gov  
August 30, 2006

  
Fred Ferris  
Primary Examiner  
TC 2100